

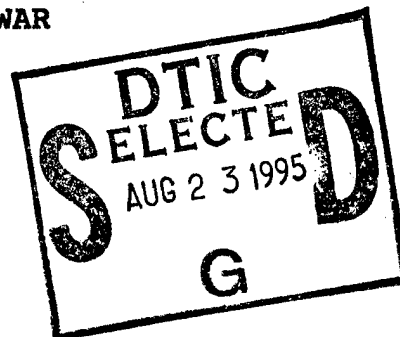
NAVAL WAR COLLEGE  
Newport, R.I.

ELEMENTS OF OPERATIONAL DESIGN  
IN THE RUSSO-FINNISH WAR

by

William H. Deane

LTC, USAR



A paper submitted to the Faculty of the Naval War College in partial satisfaction of the requirements of the Department of Operations.

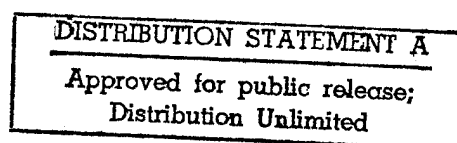
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Signature: William H. Deane

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Abstract of

**ELEMENTS OF OPERATIONAL DESIGN IN THE RUSSO-FINNISH WAR**

The Russo-Finnish War of 1939-1940 presents several lessons and pertinent examples of Operational Design, both well and poorly crafted. It can serve as an important case study, specifically in regard to the capabilities of a smaller force operating without technical advantage to successfully delay, allowing time for an external response, coalition or allied. In addition, the conduct of the operation by the Soviet forces offers historical perspective that may be applied to the current environment, using force against smaller nations in the "near abroad." The Soviet emphasis on an operational solution to overcome tactical weaknesses, training and employment, is also demonstrated. The components of operational design are tracked through the preparation and execution of the conflict, comparing anticipated results of that design with the reality achieved.

## I - INTRODUCTION

General. Between 30 November 1939 and 13 March 1940, The Soviet Union and Finland engaged in a struggle that would determine the future of that small, neutral Scandinavian country. The forces of the former were significantly larger in both manpower and material. In addition, the Russian superiority in economic infrastructure and national power base would have seemed to pre-ordain the decision. Yet, the Finnish forces were able to extend the conflict and produce a military outcome that allowed a political end-state favorable to the nation, if not in absolute terms, then relative to the potentially disastrous results that would be expected by the initial analysis. What were the keys to this relative success? Are there lessons for the "operational artist" to be found in this short war? This paper will examine the Russo-Finnish War from the Operational Design perspective and attempt to highlight those components of design that, by virtue of being either well or poorly crafted, determined the outcome.

Justification for Study. Operational art from the joint warfighting perspective is defined as:

The employment of military forces to attain strategic and/or operational objectives through the design, organization, integration, and conduct of strategies, campaigns, major operations, and battles. Operational art translates the joint force commander's strategy into operational design, and, ultimately, tactical action, by integrating the key activities of all levels of war.<sup>1</sup>

Operational design in turn, is composed of the tools or methodologies that the operational commander uses "to insure that one's own forces and assets are employed in a coherent manner focused on the assigned operational or strategic goals in the theater."<sup>2</sup> The study of any historical case, whether recent or ancient, should provide insight into the application of military art. Although

tactics may change drastically through the ages in response to advances in technology, the ability to translate between strategic goals and tactical execution is a skill that is less volatile. Thus, from a simple professional standpoint, any conflict, particularly one that contains extraordinary results, should be food for thought.

In addition to the straightforward professional justification, the Russo-Finnish War offers several parallels to more current military situations and applications. First, it provides a case where a smaller force, without significant technical advantages over its larger opponent, defends in place long enough to allow external, potential coalition, reinforcements. The analogy to positional defense in Kuwait and the GCC, narrow zone with limited forces, may be an appropriate one to address. Second, it provides additional historical perspective relative to Russian operational employment, both in and of itself, and in regard to actions against smaller nations located in the "near abroad." Dependence on mass alone and poor interaction between armor and supporting infantry, while facing motivated local forces well-conditioned to their environment, are as clear in Finland in 1939 as in Chechnya in 1994. Third, in the age of "Revolution in Military Affairs," there is the need to temper obsession with technical hardware advances with the knowledge that appropriate doctrine, training and integration are co-requisites for successful military employment. The Russo-Finnish War witnessed masses of state-of-the-art hardware on the Soviet side that was misapplied. In fact, both Russian doctrine, in the form of "deep battle" operational art,<sup>3</sup> and an appreciation for mechanization was present--it just did not apply to large areas of Finland where it was employed.

## II - STRATEGIC ENVIRONMENT AND OBJECTIVES

Background. The international situation in November 1939 was rapidly

deteriorating. In particular, Hitler had completed his conquest of Poland with the Soviet Union occupying the Eastern zone. A state of war existed between France and England and Germany, however, it was currently characterized by non-activity, the "Phoney War." Hitler's primary diplomatic effort was to retain good relations with the Soviet Union in the East until he could bring the war in the West to a decisive conclusion. The delineation of spheres of interest between the two powers had resulted in the sacrifice of the Baltic states, for all practical purposes absorbed into the Soviet Union, and Finland. The latter had relatively strong historical ties with Germany. In particular, practically the entire Finnish military officer elite had served together in the 27th Prussian Jaeger Battalion during 1916-1917.<sup>4</sup> This led to a feeling that Germany would be a potential source of assistance despite the Non-Aggression Pact.

Finland's own independent existence was not particularly well established. Under Swedish dominance until 1809, it had been Russian controlled until 1917 when it effectively seceded during the Russian Communist Revolution. Finland fought its own version of the Civil War; with Imperial German assistance in 1918 it finally crushed the internal Communist forces. The Treaty of Tartu, in 1920, formalized the peace between Russia and Finland and established the borders. Unfortunately for the Finns, the history of the Civil War (Russian White units and elements of the Allied expeditionary forces used Finland as a base of operation), Soviet paranoia regarding possible capitalist invasions, the strategic threat/exposure to Leningrad and Murmansk, potential German strategic interest in the Scandinavian region, and the anti-Communist internal policies of the Finnish government, all combined to produce a climate that did not support long-term peaceful relations. Stalin recognized that the Scandinavian countries would become involved in the World War, despite their attempts at neutrality.

Sweden provided up to half of Germany's high grade iron ore imports. Norway was required to transship by rail during the winter months and her territorial waters served as the line of communication. The British and French were pre-disposed to actively interdict this supply and the Germans would react by occupying part or all of those countries. As a result, Russia recognized the need to build a buffer between herself and either or both of Germany and the Western Allies.

Finland recognized the threat from the Soviet Union, however, she placed significant hope in the prospect of support either from the other Scandinavian countries, particularly Sweden, Germany, the Western Allies, or the League of Nations. From a practical standpoint, Finland disposed of an army of some 11 divisions (one of which lacked heavy equipment) when her reserves had been mobilized. The active professional army numbered only about 30,000, organized into brigades whose primary function was to serve as training units for the annual conscript class and to deploy forward as a covering force during full mobilization. A plan for increasing armaments was based on domestic production, but would not be complete until 1944.<sup>5</sup> As a result, there was a tremendous lack of modern weapons systems, particularly tanks, aircraft, and artillery. The most critical expected line of operation, Northwest through the Karelian Isthmus, had been fortified, the so-called Mannerheim Line. This position was comprised of a minimum number of concrete bunkers and pill boxes along with expedient trenches and obstacles. The line never approached the sophistication or protection of the Maginot Line to which it is often compared.<sup>6</sup>

**Diplomatic Prelude.** Diplomatic negotiations between Finland and the Soviet Union occurred in three phases during October and November 1939. Despite some minor concessions on each side, the core positions were basically unchanged throughout. The Soviet Union desired the withdrawal of the current border within

the Karelian Isthmus some 20 to 30 miles, creating a buffer for Leningrad. In addition, Finland should cede portions of the Rybachiy Peninsula along with certain islands in the Gulf of Finland, lease an air and naval base at Hanko (at the mouth of the Gulf of Finland), destroy fortifications within the Karelian Isthmus, and conclude a mutual assistance treaty with the Soviets.<sup>7</sup> In return, the Russians were willing to cede back from Soviet Karelia about twice the land area given up by the Finns. The Finns were willing to consider the ceding of the islands and minor straightening of the border. The loss of Hanko, however, was not acceptable, nor was an agreement that resulted in the loss of the defensive position on the Isthmus or the loss of a strictly neutral position (as a consequence of a mutual assistance agreement). All of the discussions took place in an atmosphere that the Finns interpreted as relatively open. They felt that the Soviets were bluffing and negotiations would continue. Contact with the Swedes and Germans provided negative support for going to war over these demands. Marshall Mannerheim himself presented a very dim projection of Finnish military prospects if war came, but this was opposed by that of the Defense Minister, Niukkanen, who felt that Finland could hold out for at least six months.<sup>8</sup> When presented the initial Soviet demands in October, the Finns mobilized their reserves, began movement of the regular brigades into the covering force area, and evacuated civilians from the cities and border districts. The Russians manufactured an incident on 26 November 1939, alleging Finnish artillery had fired into Soviet territory resulting in four Russian deaths, and used that as the basis for assuming the offensive on 30 November.

### III - ANALYSIS OF OPERATIONAL DESIGN

Strategic Goals. The strategic goals set by Stalin, the Soviet "NCA," were nothing less than the total occupation of Finland and its subsequent absorption

into the Soviet Union, like the Baltic states, or conversion into a client puppet state. This goal is quite at odds with the initial demands of October and November, which in essence became lesser included results, but represents the natural maturation of historical trends. The Communists had been forced into granting Finland's independence due to their preoccupation during the Civil War. If war was required, the incremental increase in cost for complete versus limited aims appeared minimal.<sup>9</sup> The Leningrad party apparatus and exiled Finnish Communists provided an erroneous evaluation of the social conditions within Finland.<sup>10</sup> This coupled with a lack of appreciation for the relative capabilities of the two armies tainted the strategic and operational planning process.

For the Finns, the strategic goal was national survival. They felt that the "reasonable" demands of October/November were only the prelude to further steps that would be increasingly difficult to resist. Since it was obvious that Finland could not defeat the Soviet Union, the basic assumption was made that survival could result from either delaying until international support arrived or from inflicting sufficient pain to make the Soviets judge the potential gains not worthwhile. In either case, these were translated into a single goal, give up space as slowly and dearly as possible while inflicting the maximum casualties possible on the Russians.

Guidance, Objectives, and End States. These components of operational design represent the translation of strategic goals into militarily recognizable and achievable targets and results along with the aims, resources, restraints, and constraints that limit the acceptable military solution set. Operational guidance delivered by the Soviets was poor. The resources provided were heavily mechanized and logistically dependent yet utilized in restricted terrain with minimal lines of communication. The forces were advised that the Finnish Army

would probably suffer large scale disaffection among its leftist worker reservists. They were further advised that the populace was ready and willing to support "liberation." As a result, many combat units carried ludicrous propaganda material into the campaign. Guidance did not stress the potential difficulties and the need for training and acclimatization to the weather and terrain. Soviet objectives were not realistic although from a grand tactical perspective, if terrain and capability could be ignored, the overall concept was impressive. The end state was well defined, the total destruction of the Finnish Army, location of massive Soviet forces throughout Finland, and the positioning of the exiled Finnish Communists for assumption of power.

Mannerheim provided excellent guidance, although some failures in intelligence were present North of Lake Lagoda. Here his analysis that only three Soviet divisions could be logistically supported was only partially valid. Secret construction of roads leading to the border, allowed for the maneuver of twice that number. The guidance to the main Isthmus area forces was to make maximum use of the opportunity for delay in the covering force area; this, unfortunately, was not adequately implemented by the tactical commanders and it is estimated that a week was lost along with opportunities to inflict additional losses on the attackers. Guidance was clear that delay and defense alone were not sufficient; each tactical commander was expected to counter-attack aggressively even when dramatically outnumbered. Objectives were geographically and force oriented, critical communication nodes, defensive positions, and enemy forces. The end state desired was an effective defense East of Viipuri, with Soviet forces not able to maintain the initiative. Unfortunately, this end state was not achievable.

Identification of Critical Points and Centers of Gravity. The Soviets

correctly identified the Finnish center of gravity (COG) as its Army. Due to the limited manpower and internal weapons production, Finland would be unable to reconstitute following a series of major losses. Alternatively, if the front could be extended or made fluid, the force size would be inadequate to constitute an integrated defense and the Finns could be defeated in detail. During the period 30 November through 15 January, the Soviets identified the critical points as geographically oriented in the attempt to attack the COG indirectly, out maneuvering the force and bypassing the Mannerheim Line. The multiple major lines of operation were designed to fragment the Finnish effort and dissipate its strength away from fixed fortifications. On the other hand, during the period 15 January through 13 March, the COG was attacked directly, using overwhelming mass and firepower, willingly accepting high attrition rates in order to inflict only a fraction of that amount on the smaller force. Critical points were the low quality of the fortifications, lack of Finnish artillery and ammunition, and force size that precluded rotation of troops out of continuous contact.

The Finns correctly identified the Soviet COG as time. Extending the defense allowed the possibility of international intervention. This and the threat of ongoing guerilla warfare were the influencing factors in Soviet negotiations. A critical point for the Soviets was their lack of tactical skill, which allowed limited Finnish combat power to be used to maximum effect. Mass packed infantry formation were decimated by light but accurate shelling; poor coordination between armor and infantry resulted in both arms being extremely vulnerable to defeat in detail.

Choice of Direction and Axis. The Soviets chose six major lines of operation during the initial period. Each led to a major communication node. The routes were as direct as possible, and led to appropriate objectives. The

nature of the terrain, however, reduced the ability of the Soviets to support and maneuver a force adequate to defeat the defending Finnish units astride each. Poor communication, leadership, and tactical skill at all levels from individual to division only compounded this situation. The number of Finnish forces diverted was limited. The Soviets might have benefitted by using a minimal force to secure Petsamo in the North, avoiding the three thrusts in the center altogether, and concentrating more forces in the two Southern lines of operation. The load on the Murmansk rail line would have been reduced and the mechanized forces freed would have been more appropriate to the terrain in the Isthmus.

There was no operational level use of direction and axis by the Finns. They operated on interior lines in a strictly defensive and limited counter-attacking role. Tactical movement was ever present, imaginative, and effective.

Operational Scheme. As is intimated by the preceding discussions, the initial Soviet operational scheme was based on a combination of direct attack on the fortified zone in the Isthmus supported by a major (roughly same size) envelopment to its North. The former would hopefully penetrate and destroy portions of the main defensive force but as a minimum hold it in place while the latter drove into the rear area, destroyed its logistical links and attacked it from the rear. To tie up the operational reserve, major lines of operation in the center and North were also executed. The final Soviet concept depended on a massive direct assault within the Isthmus, using tactical breakthrough, mass, fire, and exploitation in contrast to an operational maneuver to defeat the main Finnish force. Improved tactical performance, highly favorable force ratio, combined arms coordination, massing of artillery, and disregard for personnel losses made this design successful whereas the earlier, more "elegant" operationally oriented design failed.

The Finnish design depended on economy of force operations in the center and North; if necessary, loss of space there would be accepted in preference to commitment of sizable forces. Maximum effort would be placed in the Isthmus to hold the prepared positions forward of Viipuri at all costs. Limited forces would be used North of Lake Lagoda to the extent necessary to block any outflanking Soviet force. Material resources needed to be husbanded; artillery can only be used to attack massed infantry assaults and not for counter-battery fires. Counter-attacks must be implemented to restore positions in the prepared defensive line. The intent will be to hold through the cold Winter, using the Spring thaw to additional advantage. This should provide adequate time for international aid to arrive.

Reality Check--Execution Versus Plan. Refer to Map 1 and Table 1 for a theater overview and list of initial forces. The Russian positioning of forces and concept of operations forced the theater into four major operational areas; time wise, the conflict can be broken into two major phases: November 30 through mid-January and mid-January through 13 March. During the first phase, massive Soviet attacks throughout the theater met with limited success but were followed by impressive Finnish tactical gains.

The major force and priority of effort was directed through the Karelian Isthmus by the Seventh Army. The key to ultimate success was the communications hub at Viipuri on the Gulf of Finland coast, roughly 15 miles to the rear of the Mannerheim Line. Small company and battalion level covering forces had delayed the advancing Russians about five days prior to arriving at the Mannerheim Line. Initial psychological/tactical problems dealing with armor and a possible breakdown in communicating commander's intent cost the Finns additional time in this delaying action. Between 6 December and the end of the month, Soviet effort

concentrated against two portions of the line, first at Taipale and next at Summa. With poor combined arms coordination and terrible tactical deployments, the result was a mauling of seven divisions with a loss of nearly 300 tanks.<sup>11</sup> These losses plus the requirement to resupply and refit temporarily ended the direct approach. The Finns attempted a counter-attack on 23 December. Based on a double pincer movement, it maneuvered five divisions, including one from the operational reserve, on the right wing with the intent of destroying three Soviet divisions and perhaps gaining a month's delay--additional time for international intervention. Unfortunately, the attack met with only limited success and incurred sizable losses for the Finns. This area would remain relatively quiet until February.

The primary supporting Soviet line of operation passed on multiple roadways North of Lake Ladoga under control of the Eighth Army. Here seven infantry division with supporting armor attempted to penetrate to the rail line Suojärvi-Sortavaara. Taking this objective would have outflanked the Mannerheim Line and opened the interior of Finland to exploitation. The Finns had originally felt that the Soviets could not support more than a three division force in this area<sup>12</sup>, so they positioned elements of two with the ultimate plan of holding, counter-attacking, and then freeing reserves for employment on the Isthmus. In fact, rather than freeing resources, two regiments from the operational reserve were required, committed to the area with phenomenal tactical success in the Tolvajärvi and Kollaa areas. There were the first employment of the "Mottis" tactics.<sup>13</sup> Elements of three Soviet divisions were destroyed and the remainder blocked for the duration of the campaign. No resources, however, were freed for utilization on the Isthmus.

A secondary supporting line of operations under control of the Ninth Army

with five divisions attempted to cut Finland in half. The major port and rail center at Oulu was the objective. Here again, a decidedly smaller force, elements of the Ninth Division, produced tactical miracles by totally destroying two Soviet divisions in the classic military Battle of Suomussalmi. Nearly 30,000 Soviet were killed at the cost of 900 Finnish KIA. Two other divisions were blocked by substantially smaller Finnish forces and forced into limited withdrawals. The final division was surrounded and remained in place for the duration of the conflict.<sup>14</sup> Once again, the result was a stalemate that endured until the end of the war.

The final supporting line of operation under control of 14th Army with three divisions, was assigned the objective of occupying Petsamo in the extreme North, and then driving South along the Arctic Highway to Rovaniemi, Finland's only significant communication center in the far north. Its primary purpose was to seal off any potential international intervention and protect the Soviet port of Murmansk. Very small Finnish units along with terrible weather conditions combined to block this thrust after it had taken Petsamo. No further gains were made during the conflict.

The situation at the end of the first phase represented a clear advantage for the Finns. The Soviet advance had been stopped on all fronts and tactical victories achieved that embarrassed the Soviet military. Unfortunately the basic assumption of Finnish strategy had proven false. There was no significant international assistance in the pipeline. To make matters worse, however, through a combination of wishful thinking on the part of Finland's political leaders and less than honest proposals for aid from the Allies,<sup>15</sup> there continued the hope that such assistance was still possible. The Finnish population itself, along with a segment of its government, gained false hopes

from the tactical victories and proved difficult to convince that a political settlement with adverse terms was demanded by the military situation.<sup>16</sup>

The Soviets reassessed their initial performance. The result was a rearrangement of command. Generals Timoshenko and Zhukov were appointed commander and chief of staff, respectively, for the continuation of the operation. Major improvements in tactical planning and training and preparation were implemented to include division level training against full scale mockups of the Mannerheim Line fortification. Combined arms coordination was improved and massive artillery fires were prepared. At this point we see a change in operational design, specifically the operational scheme. The focus in this phase was simplified, concentrated only in the Isthmus area, and based on massive sustained tactical level success rather than brilliant operational maneuver. Artillery fires increase from mid-January to 1 February. There followed ten days of intense, 24-hour a day shelling combined with ground and air attacks. The Russians suffered terrible losses but were able to rotate units out as necessary. The Finns could not. The physical and psychological pressure reached the critical point by the time the main assault began on 11 February; on the 15th, Mannerheim ordered a withdrawal from the main positions to the Intermediate Line and the breakthrough began. By 4 March, the equivalent of 30 Russian divisions were assaulting the remaining line and when the ceasefire took effect on 13 March, the Finnish line was close to total collapse, to include the first instances of refusal to accept orders by entire units.<sup>17</sup> The final operations of the Finnish Army had been a race against time to avoid disintegration prior to the acceptance of an acceptable peace. The terms offered were considerably harsher than those presented in October 1939. With close to 25% casualties, there is certainly a question as to whether the war was worthwhile for Finland.

#### IV - CONCLUSIONS AND LESSONS LEARNED

There is no doubt that the tactical performance of the Finnish Army was outstanding and that, particularly during the first half of the conflict, the Soviets suffered in comparison. The basis for the difference can be identified in two areas. First, the tactical preparation, training, skill, and leadership of the Soviet formations employed was a level of competence lower than that of the Finns. There were ample cases of courageous individual and group defense by Russians. In most instances, it was similar to a mindless despair or resignation that would be seen again during the first years of the German invasion. Second, there was a failure at the operational level to focus the design and scheme on methods that were appropriate to the tactical skill set. Given other terrain, wide open Poland for example, the initial operational design would have been more successful. Here it was not. We see that the operational design and scheme selected must be appropriate for both the environment and the tactical proficiency and characteristic (high/low tech) of the implementing force.

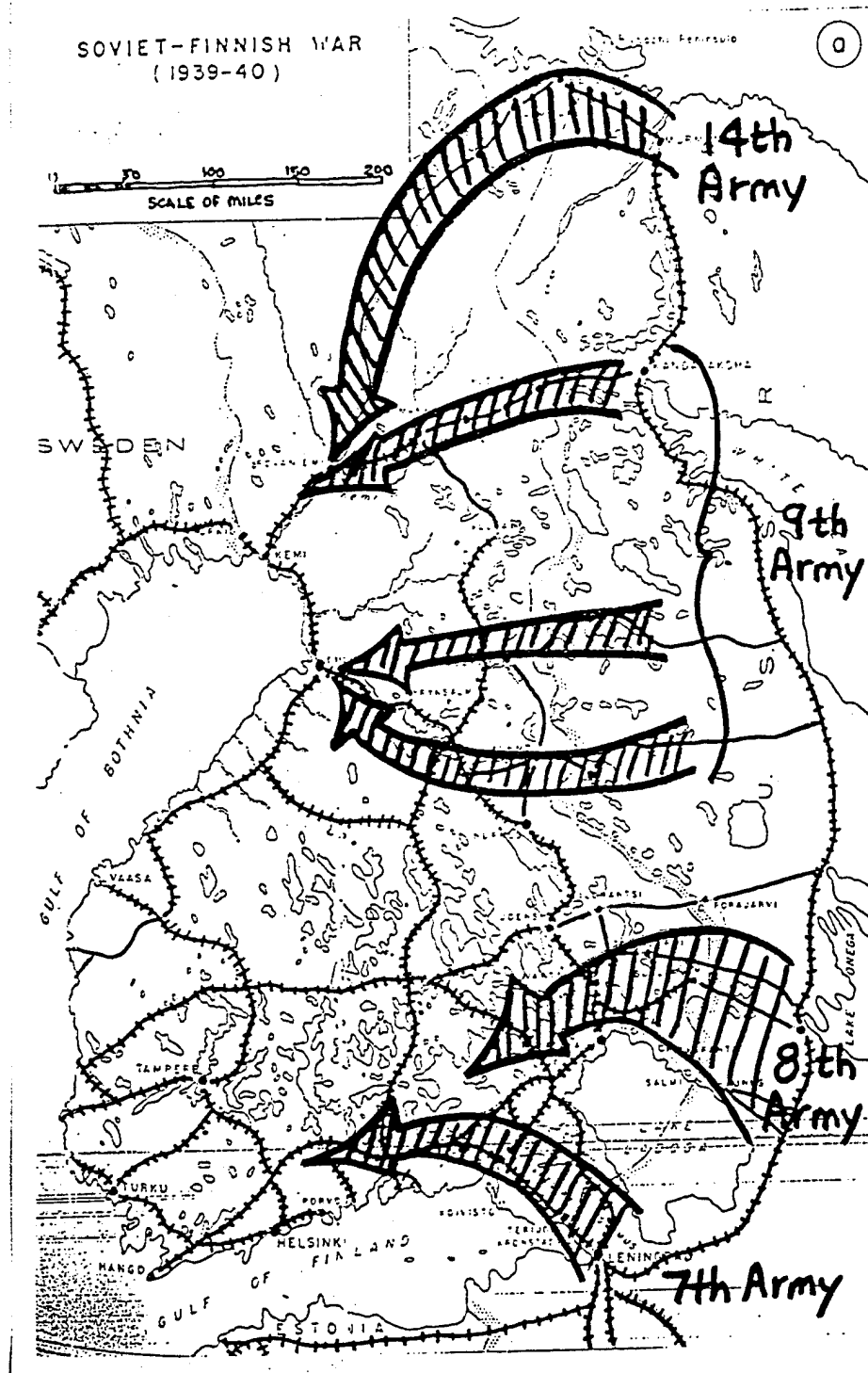
Next we see the advantage of reassessing operational design and scheme. War is a constant interactive process. As the environment changes, or we force it to change, our design must be recycled and an improved scheme determined if appropriate. That the Soviets were able to respond to the lessons of December and January, and focus on both improving the tactical skill level and in selecting an operational scheme that was more appropriate for that tactical level and orientation, is more significant than the initial poor performance. Despite the "bad press" received, the Soviets adjusted the doctrinal Regulations following the Russo-Finnish War, improved cold weather training and tactics, restored General Officer rank, tightened discipline, reduced the role of the political commissar, reorganized the armored forces, and generally took advantage

of the learning experience prior to facing Germany.

From the Finns we can learn the value of tactical proficiency and the positive feedback it can have at the operational level. An effective operational design blueprint can be transformed into reality if there are good sharp tactical tools at hand. Effective use of terrain and force structure is key to an operational scheme that must make minimum resources accomplish the impossible. It is also clear that mere possession of large numbers of sophisticated weapons systems will guarantee nothing. The systems must be integrated tactically; doctrine and training at the operational level must be adjusted to take advantage of their potential. Hardware employed in the wrong environment is merely junk. It is the role of the operational designer to structure his guidance and resource allocation to avoid commitment of inappropriate weapon systems.

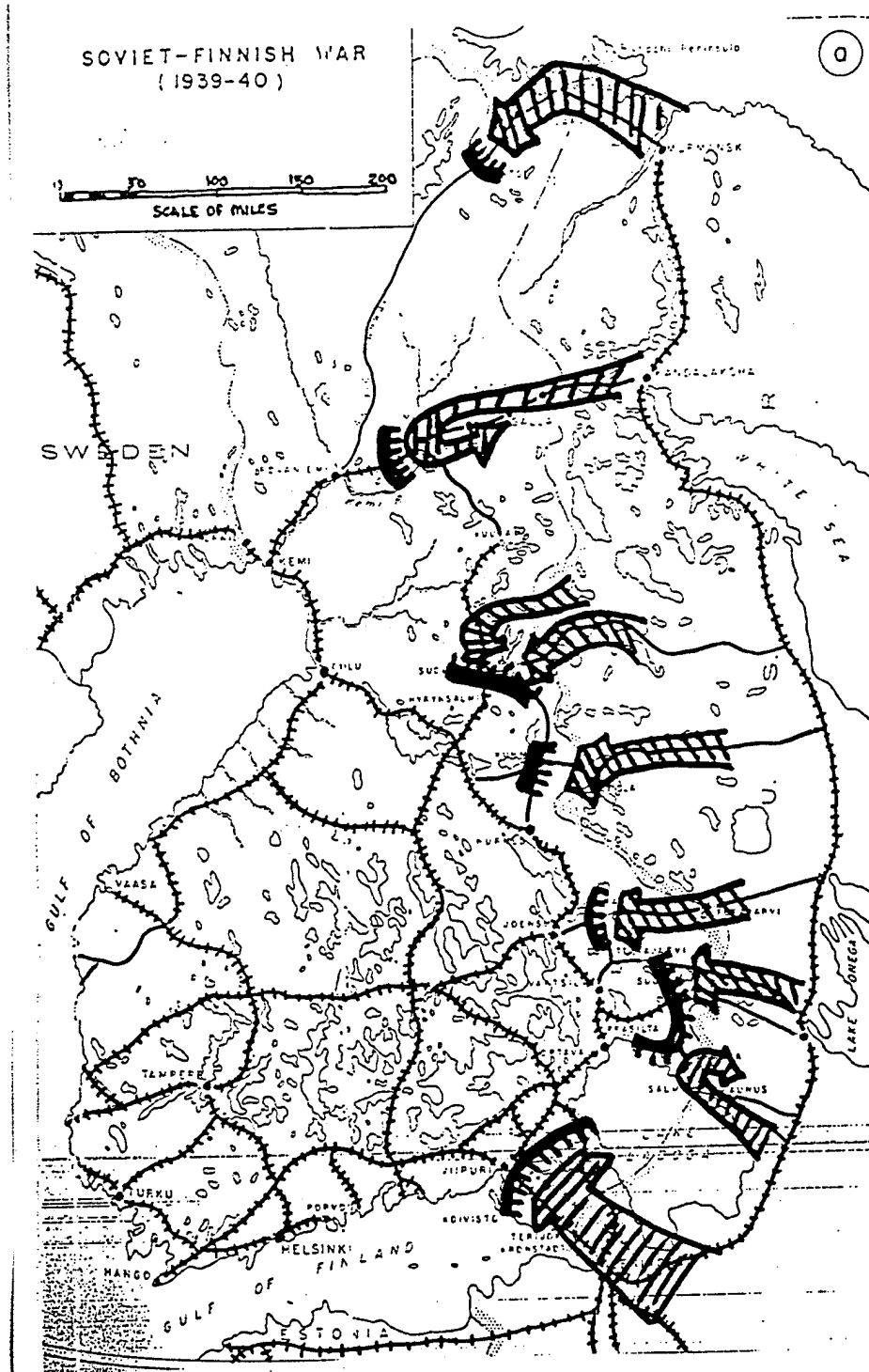
MAP 1

PLANNED RUSSIAN LINES OF OPERATION<sup>18</sup>



MAP 2

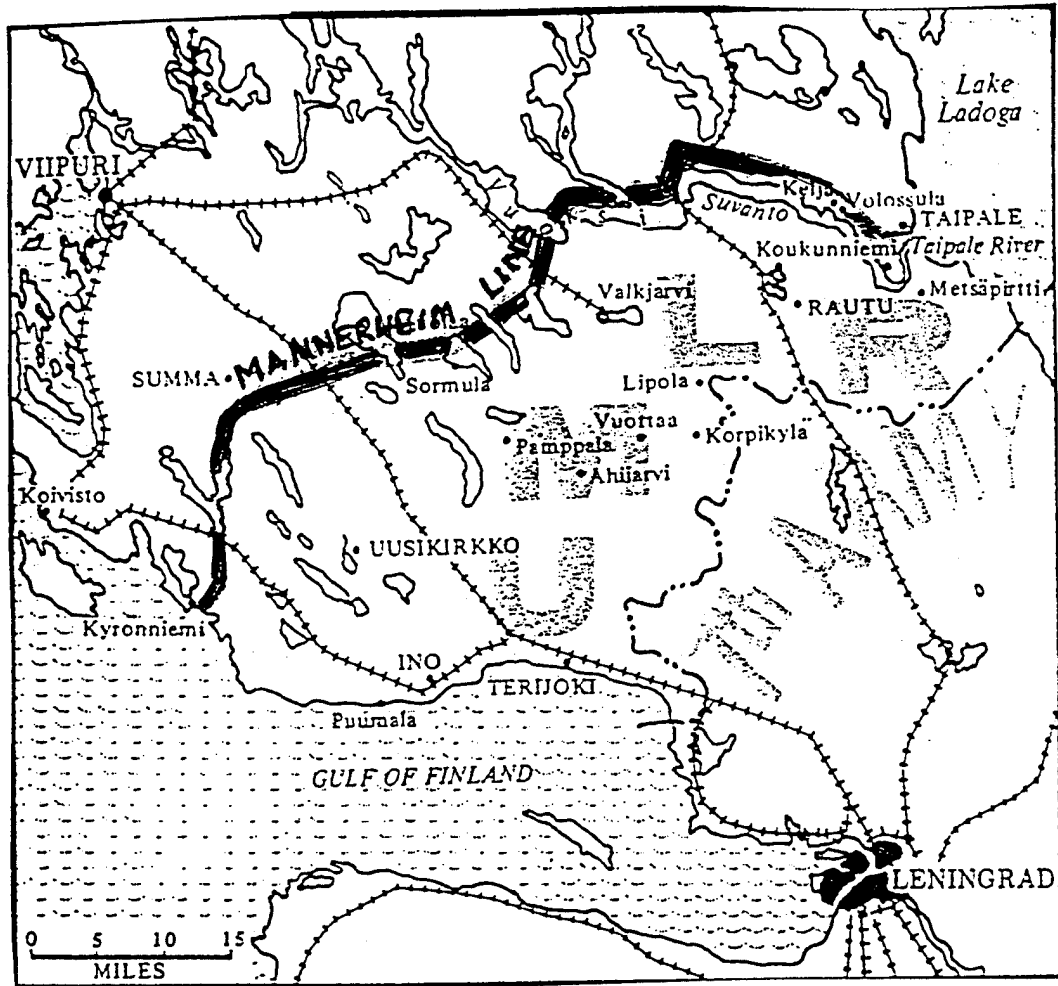
ACTUAL RUSSIAN ADVANCES IN PHASE 1<sup>19</sup>



MAP 3

KARELIAN ISTHMUS AREA OF OPERATION<sup>20</sup>

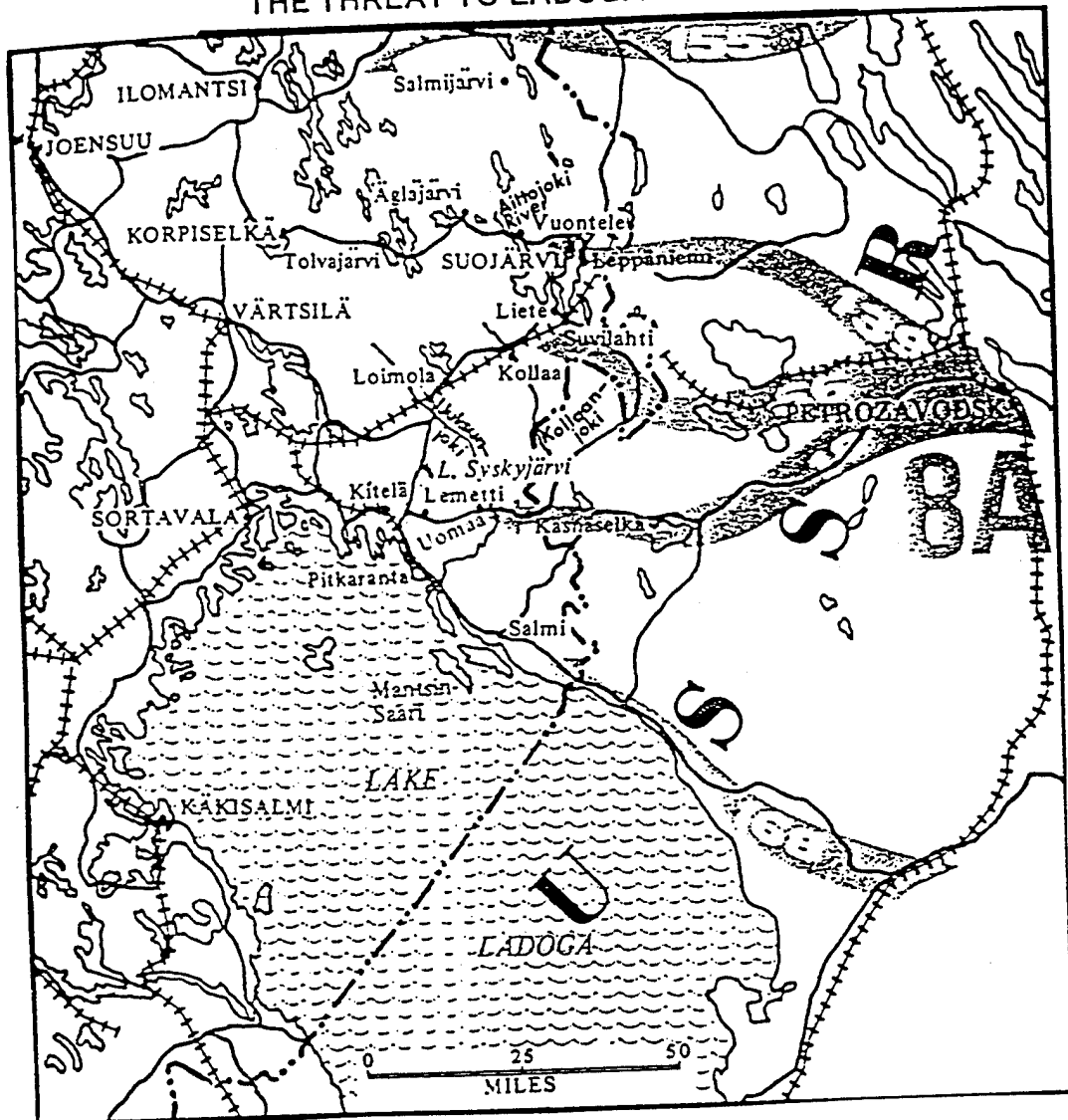
THE KARELIAN ISTHMUS



MAP 4

LADOGA-KARELIA AREA OF OPERATION<sup>21</sup>

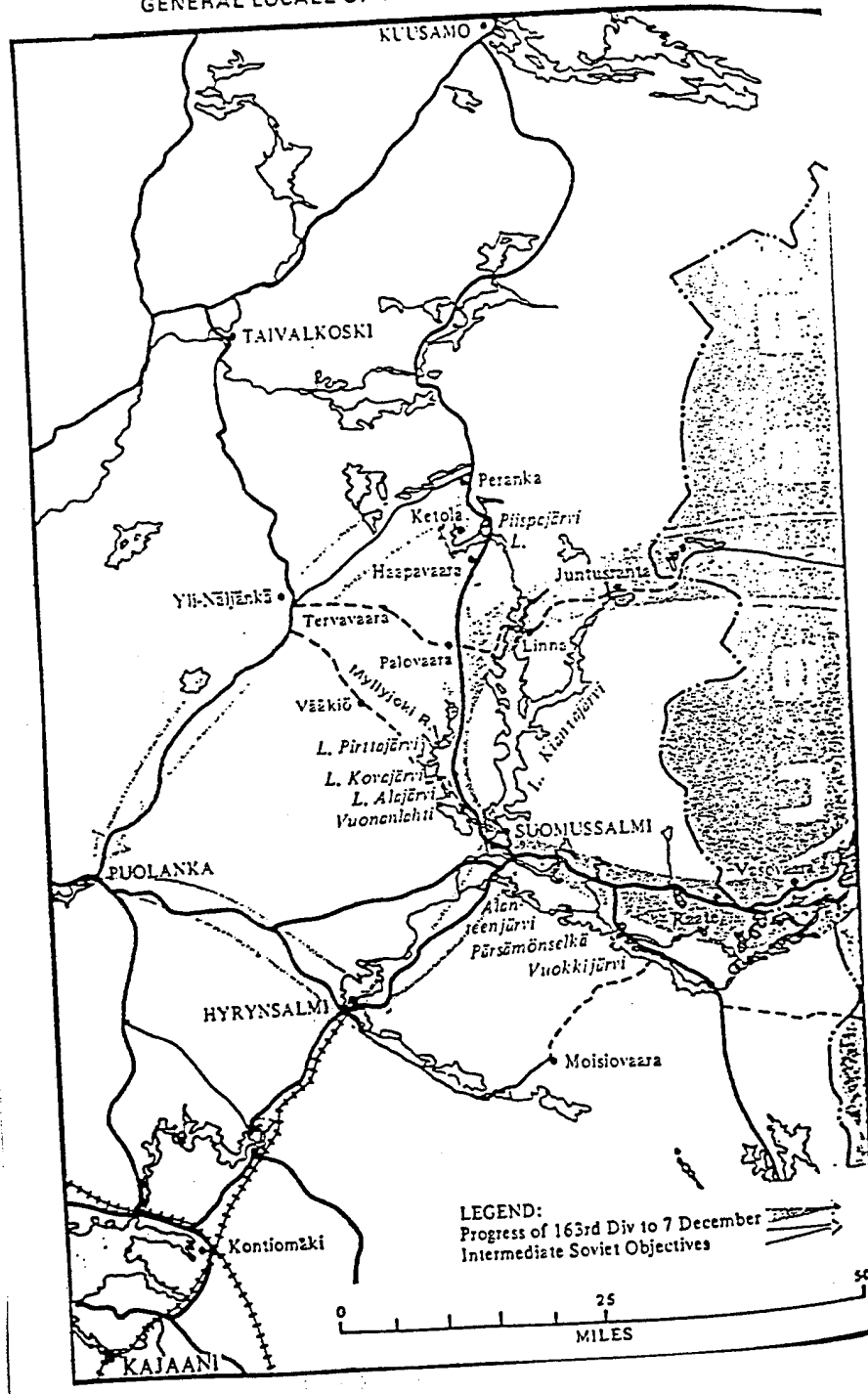
THE THREAT TO LADOGA-KARELIA



# MAP 5

## CENTRAL FINLAND AREA OF OPERATION<sup>22</sup>

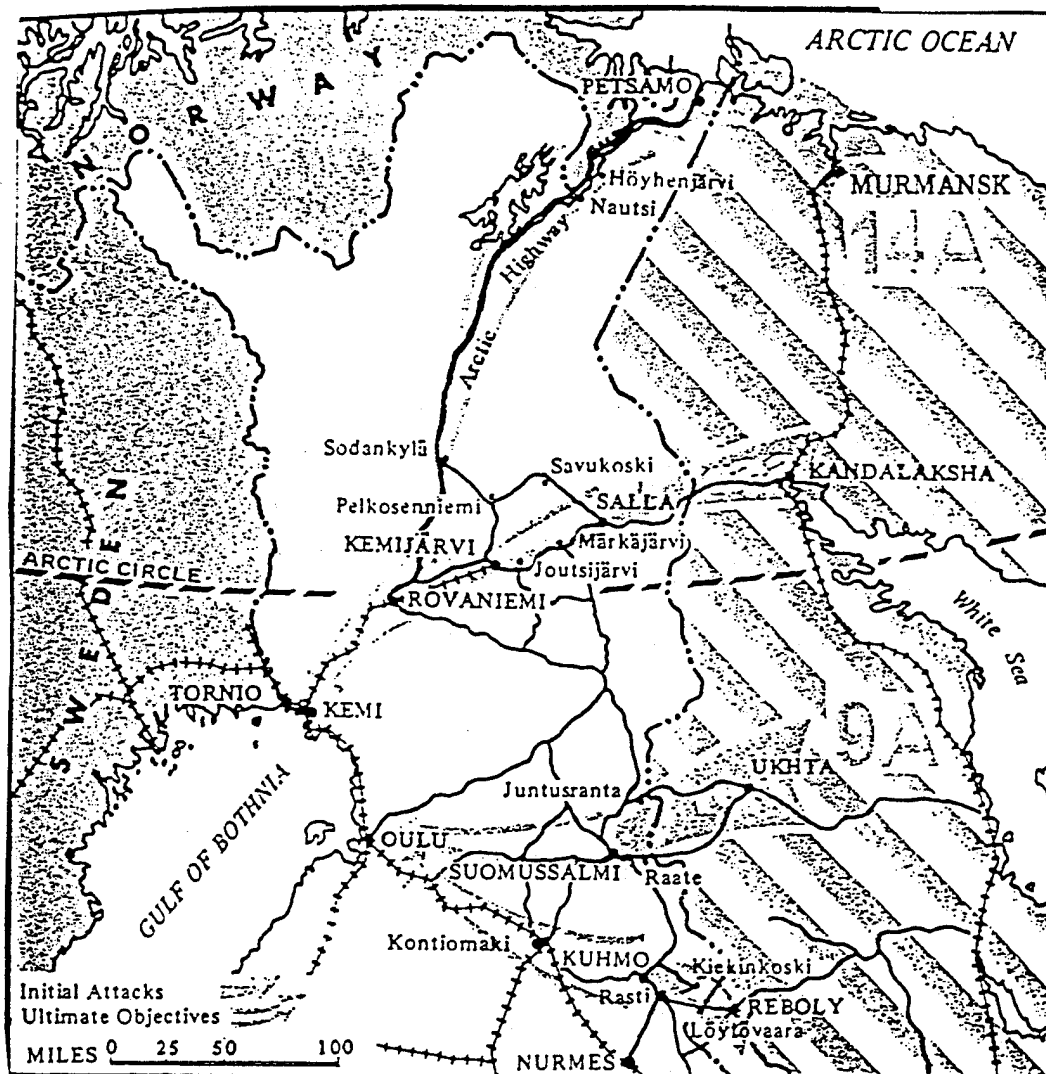
### GENERAL LOCALE OF THE SUOMUSSALMI BATTLES



# MAP 6

## NORTHERN FINLAND AREA OF OPERATION<sup>23</sup>

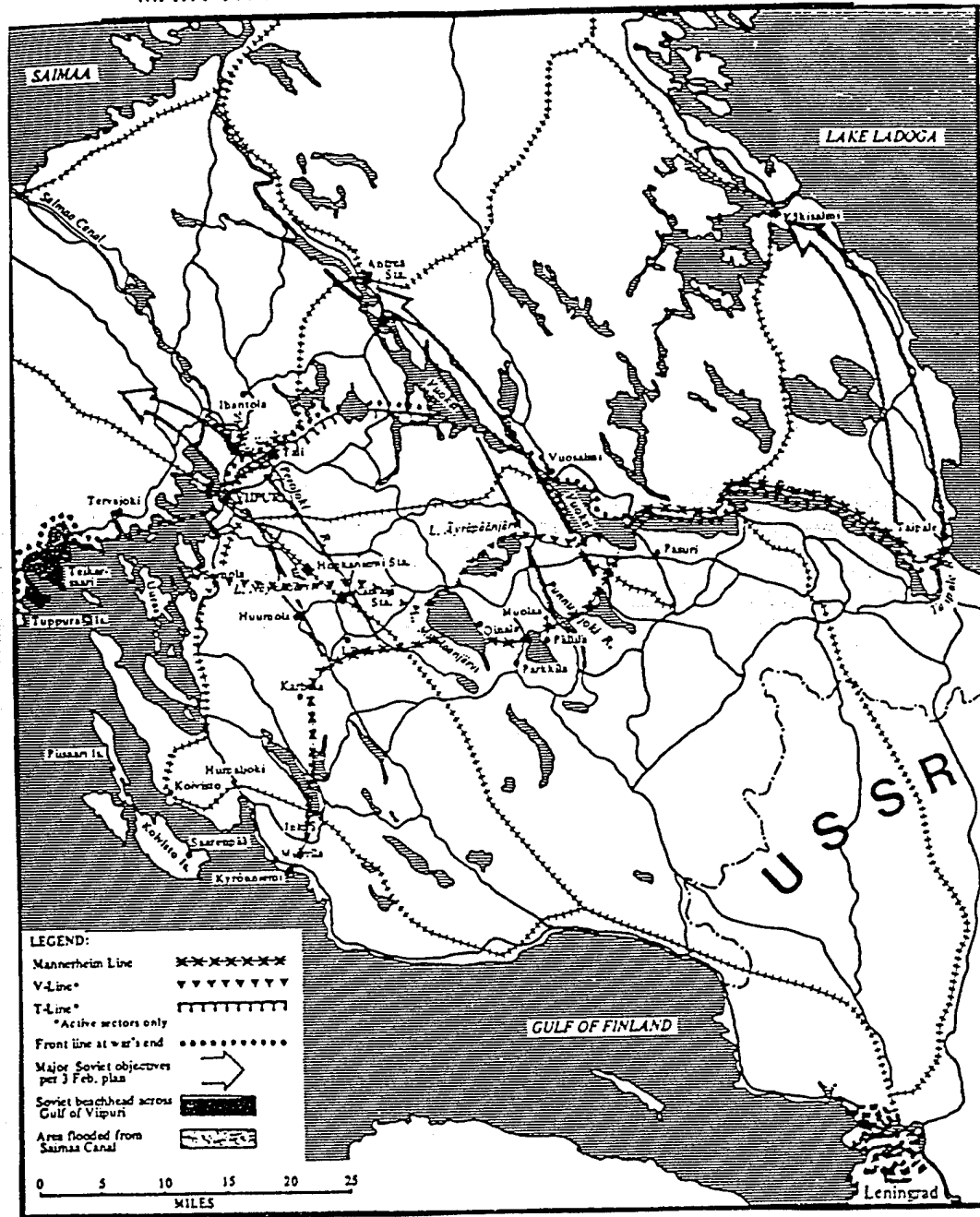
### NORTHERN THRUSTS OF THE RED ARMY



# MAP 7

## KARELIAN ISTMUS AREA OF OPERATION - SECOND PHASE<sup>24</sup>

MAIN THEATER OF OPERATIONS, FEB.- MAR. 1940



**TABLE 1****INITIAL FORCE LEVELS<sup>25</sup>**

LOCATION	RUSSIAN FORCES	FINNISH FORCES
Karelian Isthmus	Seventh Army 14 infantry divs assorted armor	Second Corp 4th Div 5th Div 11th Div Third Corp 9th Div 10th Div Reserve 1st Div Fourth Corp 12th Div 13th Div North Finland Group bn units bn units
Ladoga-Karelia	Eighth Army 7 infantry divs assorted armor	
Central Finland	Ninth Army 5 infantry divs	
Northern Finland	Fourteenth Army 3 infantry divs	
Reserve	Front Headquarters 10-15 div equiv	Mannerheim Control 6th Div 9th Div

**TABLE 2****RELATIVE DIVISION STRENGTH<sup>26</sup>**

COMPONENT	FINNISH	RUSSIAN
Rifles	11,000	14,000
Submachine guns	250	-
Machine guns	116	206
Mortars (81-120mm)	18	30
Antitank guns (37-45mm)	18	48
Artillery cannon	36	78
Tanks	-	50

#### ENDNOTES

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3. Richard Simpkin, Deep Battle: the Brainchild of Marshall Tukhachevskii (London: Brassey's Defence Publishers, 1987), pp. 32-65. The author describes the development of deep battle and operational art concepts between 1920 and 1942.
4. William R. Trotter, A Frozen Hell: the Russo-Finnish Winter War of 1939-1940 (Chapel Hill, NC: Algonquin books of Chapel Hill, 1991), p. 5.
5. Anthony F. Upton, Finland 1939-1940 (Newark, NJ: University of Delaware Press, 1974), p. 23.
6. Upton, p. 55 and Trotter, p. 64-65.
7. Vaino Tanner, The Winter War: Finland Against Russia 1939-1940 (Stanford, CA: Stanford University Press, 1957), pp. 28-30.
8. Tanner, p. 51 and Trotter, pp. 13, 21.
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10. Trotter, pp. 18-19; Upton, pp. 44-45.
11. Trotter, p. 82.
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13. Trotter, p. 131.
14. Engle and Paananen, p. 105.
15. Trotter, pp. 234-241; Henrik S. Nissen, Scandinavia During the Second World War (Minneapolis, MN: University of Minnesota Press, 1983), pp. 71-84.
16. Allen F. Chew, The White Death: the Epic of the Soviet-Finnish Winter War (East Lansing, MI: Michigan State University Press, 1971; reprint ed., Washington: U.S. Govt. Print. Off., 1989), pp. 207-208.
17. Trotter, p. 260.
18. Engle and Paananen, p. 17; Vincent J. Esposito, ed., The West Point Atlas of American Wars (New York: Frederick A. Praeger, 1959), vol. 2, section 2, map 8; map adapted from materials merged from these two sources.
19. Engle and Paananen, p. 17; Esposito, vol. 2, section 2, map 8; map adapted from merged materials in these two sources.

20. Chew, p. 16.
21. Chew, p. 13.
22. Chew, p. 98.
23. Chew, p. 9.
24. Chew, p. 161.
25. Trotter, pp. 33-47; Nissen, p. 70; Engle and Paananen, pp. 15-21, pp. 160-161.
26. military review, battle of suomussalmi, division strength

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